

What is claimed is:

1. An inhaler for introducing a drug into a user, said inhaler comprising:
 - a first chamber adapted for containing first a compressed gas at a first pressure;
 - a second chamber in selective communication with said first chamber, said second chamber adapted for containing a second compressed gas at a second pressure lower than the first pressure, said first and second chambers cooperating so as to yield said second pressure of said compressed gas within said second chamber;
 - a means to administer two different volumes of gas in successive applications from the second chamber;
 - a storage section coupled to said second chamber, said storage section adapted for containing a drug and operating such that a portion of said second compressed gas can fluidize and aerosolize said drug to thereby produce a drug cloud; and
 - a mouthpiece coupled to said storage section, said mouthpiece adapted for receiving said drug cloud and convey said drug cloud to a user.
2. The inhaler of claim 1 wherein said first chamber contains a first compressed gas compressed between about 50 and about 4000 psig, and said second chamber contains a second compressed gas compressed between about 20 and about 100 psig.
3. The inhaler of claim 1 further comprising:

a first housing disposed within said first chamber, said first housing having a first opening therein, said first housing defining a third chamber internal to said first housing;

a second housing disposed within said second chamber having a second opening therein;

a piston slidably disposed within said first and second housings, said piston having a third opening therein; wherein

said first, second, and third openings are arranged so that a first position of said piston within said first and second housings selectively allows said communication between said first chamber and said second chamber and a second position of said piston within said first and second housings does not allow said communication between said first and second chambers.

4. The inhaler of claim 3 wherein said piston is coupled to said second chamber through a biasing member so that said piston is biased toward said first chamber.

5. The inhaler of claim 4 wherein:

said first chamber contains the first compressed gas and said first compressed gas applies a first force upon said piston toward said second chamber; and

said second chamber contains the second compressed gas and said second compressed gas applies a second force on said piston toward said first chamber; and

said first force, and said second force along with a third force due to a spring in the first housing ensure that said second compressed gas is disposed in said second chamber at said second pressure.

6. The inhaler of claim 1 wherein said means to deliver two volumes of high-pressurized gas from said second chamber occurs due to an specially shaped piston allowing successive communication between two chambers of different capacity.

7. The inhaler of claim 1 wherein said means to deliver two volumes of high-pressurized gas from said second chamber occurs due to different gas in a first orifice and a second orifice.

8. The inhaler of claim 7 wherein said first orifice chamber is a calibrated orifice so to deliver a selected amount of gas.

9. The inhaler of claim 7 wherein second orifice is larger than said first orifice and selectively opened by a piston to deliver a larger amount of gas than the gas in the first orifice.

10. The inhaler of claim 7 where the opening of the first and second gas orifices is selected by the movement of a piston.

11. The inhaler of claim 1 wherein said storage section is in the shape of a drum and comprises:

at least one first tube extending through storage section and adapted to allow the second compressed gas to pass therethrough; and

at least one second tube extending through the storage section, with said second tube adapted for containing the drug therein.

12. The inhaler of claim 11 wherein:

said second chamber further includes at least one duct extending therefrom; and said at least one duct is coupled to said storage section with said duct adapted for providing gaseous communication from said second chamber and said storage section.

13. The inhaler of claim 11 wherein said second tube is comprised of at least a first and second part mateable together, with said first part adapted for containing said drug and having a sealing overlay at its ends thereof.

14. The inhaler of claim 11 wherein a drug in a liquid or powder form is stored in said second tube.

15. The inhaler of claim 14 wherein said second tube further comprises an aerosol nozzle at an end thereof.

16. The inhaler of claim 14 wherein said second tube further includes a friction seat at an end thereof and a fixed nozzle is mateable with said friction seat to provide communication between said second tubes and said mouthpiece.

17. The inhaler of claim 14 wherein said second tube has an end coupled to a fixed nozzle to provide communication between said second tube and said mouthpiece.

18. The inhaler of claim 1 wherein said second chamber further includes a hollow spindle extending therefrom and said spindle coupled to and extending through said storage section to provide gaseous communication from said second chamber to said storage section; and

said storage section includes a tube extending through said storage section and said tube adapted for containing a drug therein.

19. The inhaler as claimed in claim 18 wherein:

said second chamber further includes at least one duct extending therefrom and said at least one duct is coupled to said storage section and operating so that said duct provides gaseous communication from said second chamber to said storage section.

20. The inhaler of claim 19 wherein a drug is in a liquid or powder form in said tube which is further sealed with an overlay at its ends thereof.

21. The inhaler in claim 20 wherein said tube further comprises an aerosol nozzle at an end thereof.

22. The inhaler of claim 1 wherein Heliox or helium compressed gas is stored in the first and second chambers.

23. The inhaler of claim 1 further comprising a spacer disposed between said storage section and said mouthpiece, said spacer being operable to receive a drug cloud from said storage section and convey said drug cloud to said mouthpiece.

24. The inhaler of claim 23 wherein said spacer comprises:

an input port hermetically coupled to said storage section; and

an inhalation port door coupled to said mouthpiece, said inhalation port door and said input port operable to allow said spacer to be selectively hermetically sealed from an ambient environment around said spacer.

25. The inhaler of claim 23 wherein said spacer comprises a pressure port, said pressure port operable to selectively allow removal of gas within said spacer when said drug cloud is received by said spacer.

26. The inhaler of claim 23 wherein said spacer comprises a pressure/vacuum port, said pressure/vacuum port operable to selectively allow ambient air into said spacer when user inhales a drug cloud.

27. The inhaler of claim 23 wherein said spacing further comprises a scented receptacle.

28. The inhaler of claim 23 wherein said spacer comprises a plurality of shelves disposed therein, said shelves operable to facilitate laminar flow of a drug cloud through said spacer.

29. The inhaler of claim 1 further comprising a diffuser disposed between said storage section and said mouthpiece.

30. The inhaler of claim 29, wherein said diffuser comprises a plurality of shelves disposed therein, said shelves operable to facilitate laminar flow of said drug cloud through said diffuser.

31. A spacer for use with an inhaler, said spacer adapted for conveying a drug cloud from a drug cloud source to a user, said spacer comprising:

a spacer with an input port adapted to be hermetically coupled to a source of an aerosolized or fluidized drug; and

an inhalation port door of the spacer coupled to said mouthpiece, said inhalation port door and said input port allowing said spacer to be selectively hermetically sealed from an ambient environment around said spacer.

32. The spacer of claim 31 wherein said spacer further comprises a pressure port, said pressure port operable to selectively allow removal of a gas within said spacer when said drug cloud is received by a spacer.

33. The spacer of claim 31 further comprises a pressure valve, said pressure valve operable to selectively allow ambient air into said spacer when said user inhales said drug cloud.

34. The inhaler of claim 1 wherein said first chamber has a refilling and resealing opening adapted for easily refilling the chamber.

35. An inhaler for introducing a drug into a user, said inhaler comprising:

- a first chamber having a compressed gas at a first pressure contained therein;

- a second chamber in selective communication with said first chamber, said second chamber having a second compressed gas in which said second pressure being lower than the first pressure, said first and second chambers cooperating so as to yield said second pressure of said compressed gas within said second chamber upon use of said inhaler;

- a means to administer two different volumes of gas in successive applications from the second chamber;

- a venturi section coupled to said second chamber, said venturi section containing said drug and adapted for effectively receiving a portion of said compressed gas from said second chamber to aerosolize said drug to thereby produce a drug cloud;

- and a mouthpiece coupled to said venturi section, and adapted effectively receiving said drug cloud and convey said drug cloud to said user.

36. The inhaler as claimed in claim 35, further comprising a drug reservoir coupled to said venturi.

37. The inhaler as claimed in claim 35, wherein said compressed gas is helium or Heliox.

38. A method of introducing a drug from an inhaler into a spacer, said method comprising the steps of:

- providing a propellant gas at a predetermined pressure in an inhaler;

- providing a drug source in said inhaler;

- injecting said propellant gas into a portion of the drug to aerosolize and fluidize said drug in the inhaler, thereby producing a drug cloud; and

- injecting said drug cloud into said spacer.

39. The method of claim 38 further comprising, after step d, inducing a laminar flow of said drug cloud within said spacer.

40. The method of claim 38 wherein said propellant gas is Heliox or helium.

41. The method of claim 38 wherein the pressure of the propellant 20 is between about 200 psig and about 50 psig.

42. The method as claimed in claim 38, wherein a drum is disposed between said propellant gas and said spacer, said drum including a first hollow tube

extending therethrough and a second tube extending therethrough, said second tube containing said drug, wherein:

said act injecting said propellant gas into said spacer is performed through said first tube; and

said act of applying drug is applied through said second tube.

43. The method as claimed in claim 42, further comprising, after said act of injecting said drug cloud into said spacer, inducing a laminar flow of said drug cloud within said spacer.

44. The inhaler of claim 35 wherein said means to deliver two volumes of high-pressurized gas from said second chamber occurs due to an specially shaped piston allowing successive communication between two chambers of different capacity.

45. The inhaler of claim 35 wherein said means to deliver two volumes of high-pressurized gas from said second chamber occurs due to different gas in a first orifice and a second orifice.

46. The inhaler of claim 35 wherein said first orifice is a calibrated orifice so to deliver a fixed selected amount of gas.

47. The inhaler of claim 35 where said second orifice is larger than said first orifice and selectively opened by a piston to deliver a larger amount of gas than the first orifice.

48. The inhaler of claim 45 where the opening of the first and second gas orifices is selected by the movement of a piston.

49. An inhaler for administering a drug to a user, said inhaler comprising:

a gas chamber adapted for containing a compressed gas; a storage section detachably coupled to said gas chamber, said storage section adapted for containing a drug; and a mouthpiece coupled to said storage section.